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Perichaena acetabulifera sp. nov. from Juarez City, Mexico

Marcos Lizárraga[1], Gabriel Moreno[2*], Irais Flores-Romero[1]

[1] *Dpto. Ciencias Químico Biológicas, ICB, Univ. Autónoma de Ciudad Juárez, Anillo Envolvente Pronaf y Estocolmo s/n, Ciudad Juárez, Chihuahua, México*

[2] *Dpto. Ciencias de la Vida (Botánica), Facultad de Ciencias, Univ. de Alcalá, Alcalá de Henares, 28805 Madrid, Spain*

[*] Correspondence to: *gabriel.moreno@uah.es*

Abstract—*Perichaena acetabulifera* is described as a new species of myxomycete that fruited profusely in moist chamber cultures on bark samples collected from *Populus deltoides* and *Ulmus pumila* growing in urban areas of Juarez City, Chihuahua, Mexico. Photographs of its diagnostic macroscopic and microscopic features are provided.

Key words—*Amoebozoa*, myxobiota, SEM, taxonomy, *Trichiales*, *Trichiaceae*

Introduction

The city of Juarez is located in the northern part of the Mexican state of Chihuahua, adjacent to El Paso (Texas) and Las Cruces (New Mexico), both in the United States. The city has an extreme climate, with temperatures ranging from 25 to 40ºC in the summer and –4 to 13ºC in the winter. In the spring, it is frequently lashed by strong winds that reach speeds up to 100 km/h. The dominant vegetation surrounding the city consists of xerophytic shrubs, with species of *Larrea* (*Zygophyllaceae*), *Yucca* (*Agavaceae*), *Opuntia* (*Cactaceae*), and *Prosopis* (*Mimosaceae*) as the prominent taxa, while the city interior contains a large number of ornamental plants in several recreational parks and gardens. These include species of *Cupressus*, *Thuja*, *Pinus*, *Morus*, *Populus*, *Fraxinus*, *Salix*, *Melia*, *Nerium*, *Vitex*, *Platanus*, *Tamarix*, *Chilopsis*, and *Quercus*. Several studies are being carried out to determine which myxomycetes develop on the bark of these urban plants, and the first results were published by Lizárraga & al. (2015, 2018).

Perichaena Fr. is characterized by its fructifications: sessile, stipitate or short plasmodiocarps. Generic characters include a simple peridium with a membranous inner surface and a granular and fragile outer surface that sometimes is crusted with calcium oxalate. The spores are yellow or reddish brown. The capillitium, which comprises tubular filaments with irregular or regular constrictions, is superficially ornamented with warts or spines and lacks spirals and birefringence (Nannenga-Bremekamp 1991). Although the absence of spiral-like bands in the capillitium is the most distinctive character separating *Perichaena* from *Trichia* Haller and *Oligonema* Rostaf., some species lacking a capillitium are placed within *Perichaena*, including *P. heterospinispora* Novozh. & al. (Novozhilov & al. 2008), *P. taimyriensis* Novozh. & Schnittler (Novozhilov & Schnittler 2001), *P, pachyderma* D.W. Mitch. & al. (Mitchell & al. 2011), and *Perichaena nigra* D. Wrigley & al. (Lado & al. 2014).

According to Lado (2018), 34 species are currently recognized worldwide, of which 13 have been recorded for Mexico (Moreno & al. 2007, Estrada-Torres & al. 2009, Rojas & al. 2010, Mitchell & al. 2011, Lizárraga & al. 2016).

Materials & methods

Samples for light microscopy were mounted in Hoyer's medium. Macroscopic photographs were taken with a Nikon SM2800 microscope, micrographs were obtained with a Nikon Eclipse 2000 microscope, and SEM micrographs were taken with a Zeiss DSM–950 microscope after critical point drying and sputtering, following Moreno & al. (2015). The specimens are stored in the Herbarium, Universidad de Alcalá, Madrid, Spain (AH) and the Herbarium, Instituto de Ciencias Biomédicas, Universidad Autónoma de Ciudad Juárez, Chihuahua, México (UACJ). Nomenclature follows Lado (2018).

Taxonomy

Perichaena acetabulifera Lizárraga, G. Moreno & Flores-Rom., **sp. nov.** Plate 1

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Differs from *Perichaena vermicularis* by its peridial inner surface and capillitium producing ocelli and craters.

Type. Mexico: Chihuahua, Juarez City, Biomedic Science Institute (Spanish acronym: ICB), on bark of *Ulmus pumila* L., placed into moist chamber 19–VIII–2015, obtained 22–IX–2015, leg. I. Flores-Romero & M. Lizárraga (**Holotype**, AH 49096; **isotype**, UACJ 2789).

Etymology: *acetabulifera* from the Latin *acetabulum*, referring to a shallow concave vessel used as a cruet (and therefore the name given by Plinio to the suckers of an octopus) and *fer*/*fero* meaning to carry. The name draws attention to the resemblance of the capillitium and internally ornamented peridium to the suckers of octopus tentacles.

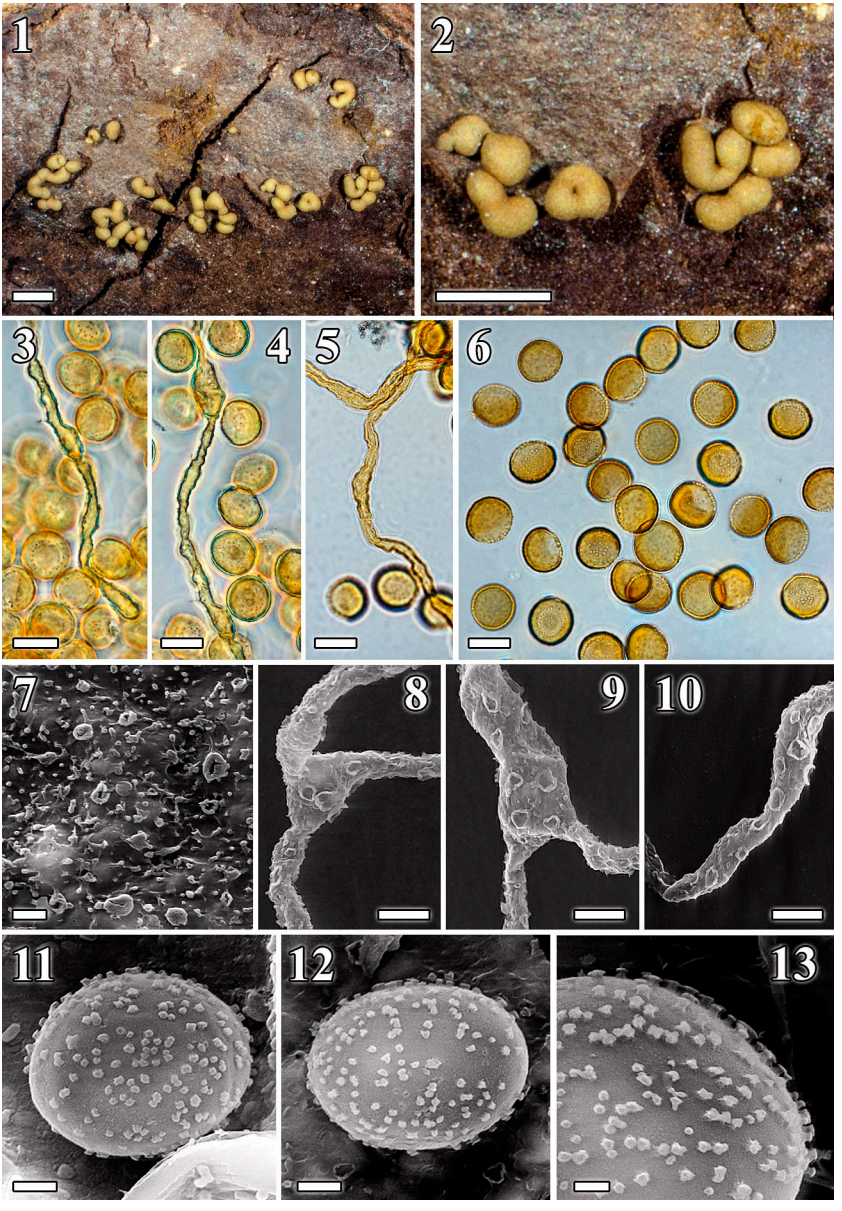

Plate 1 *Perichaena acetabulifera* (holotype, AH 49096): 1. Fructifications; 2. Detail of fructifications; 3–5. Capillitium by LM; 6. Spores; 7. Detail of the inner surfaces of peridium by SEM; 8–10. Detail of capillitium with craters by SEM; 11–12. Spores by SEM; 13. Detail of spore ornamentation by SEM. Scale bars: 1, 2 = 1 mm; 3–6 = 10 μm; 7–12 = 2 μm; 13 = 1 μm.

Fructifications scattered to gregarious, sessile, occasionally substipitate, globose, subglobose to short plasmodiocarpic, in this case somewhat sinuous, occasionally centrally depressed, to 0.8–1.5 × 0.2–0.6 mm. Stipe absent, occasionally with a blackish-brown small base up to 0.1 mm total height. Peridium simple, membranous, olivaceous yellow, inner part with papillae and small crests and craters that project over the surface. The outer surface granulose with deposits of amorphous material, brownish to olivaceous brown. Hypothallus absent or barely noticeable. Capillitium 2–6 µm in diam., somewhat abundant in the sample studied, formed by filaments with irregular edges, branched, with ocellus-like structures and craters, giving it a pitted appearance under OM. By SEM a capillitium lacking spines and reticulum can be observed, with rare and minute warts, and isolated small ocelli and craters of variable size, <2.5 µm in diam., resembling the suckers of an octopus. Spores 11–14(–16) µm in diam., ochraceous in mass, yellowish ochre by OM, globose, subglobose to oval, with a paler area, with sparse and irregular warts. By SEM the spore ornamentation is formed by warts with a flattened apex or bacula, unevenly distributed over the surface.

Other material examined: **MEXICO. Chihuahua**, **Juarez City**: Federal Public Park El Chamizal, on the bark of *Ulmus pumila*, placed into moist chamber 18–VIII–2015, obtained 29–IX–2015, leg. I. Flores-Romero & M. Lizárraga (UACJ 2827); on bark of *Populus deltoides* Marshall, placed into moist chamber 16–VIII–2016, obtained 30–VIII–2016 (UACJ 3317); obtained 20–IX–2016 (UACJ 3318, AH 49095); obtained 27–IX–2016 (UACJ 3319); obtained 17–X–2016 (UACJ 3320, AH 49100; UACJ 3321) obtained 18–X–2016 (UACJ 3322); obtained 31–X–2016 (UACJ 3323); obtained 10–XI–2016 (UACJ 3324); obtained 11–XI–2016 (UACJ 3325); obtained 10–XII–2016 (UACJ 3326). Institutes of Engineering, Technology, Architecture, Art and Design (IIT-IADA), on bark of *Ulmus pumila*, placed into moist chamber 19–VIII–2016, obtained 14–X–2016, leg. I. Flores-Romero & M. Lizárraga (UACJ 3327; UACJ 3328). Institute of Biomedical Sciences, on bark of *Ulmus pumila*, placed into moist chamber 19–VIII–2015, obtained 14–IX–2015, leg. I. Flores-Romero & M. Lizárraga (UACJ 2717); obtained 21–IX–2015 (UACJ 2773); obtained 22–IX–2015 (UACJ 2790, AH 49097); *Populus deltoides*, obtained 22–XI–2016, leg. I. Flores-Romero & M. Lizárraga (UACJ 3329, AH 49099); obtained 6–IX–2017 (UACJ 3307); obtained 13–IX–2017 (UACJ 3330); placed into moist chamber 9–IV–2018, obtaining fructifications 23–IV–2018 (UACJ 3063, AH 49098).

Observations—*Perichaena acetabulifera* is characterized by its sporocarpic to plasmodiocarpic fructifications and especially by its papillate peridium with isolated ocelli and craters, and a capillitium also with ocelli and craters, with rare warts visible only by SEM. The morphologically closest species are described below.

Perichaena vermicularis (Schwein.) Rostaf. is similar to the new species in its plasmodiocarpic fructifications, spore measurements, and the presence of papillae on the inner peridial and capillitial surfaces (Rammeloo 1981), but it lacks the ocelli and craters found in the new species.

Perichaena areolata Rammeloo is a foliicolous species with short sporothecae and craters and ocelli in the capillitium, similar to the new species. However, it can be separated its spherical areolated sporothecae, inner peridial surface lacking craters and ocelli (Rammeloo 1981), and its capillitium ornamented by spines or small appendixes.

Perichaena poronema Yu Li & H.Z. Li is distinguished by its globose sporothecae that are sometimes pulvinate, its circumscissile dehiscence by a definite preformed lid, its minutely warted and incompletely reticulated capillitium that is occasionally covered with holes, and small (8.75–9.5 μm in diam.) spores (Li & al. 1990).

Perichaena stipitata Lado & al. is a succulenticolous species that shares with *P. acetabulifera* the presence of craters or ocelli on the inner peridium, but which can be distinguished by its stalked fructifications and an inner peridium lacking papillae and crests but with dense ocelli and craters. Moreover, the capillitium has holes but lacks craters and ocelli.

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